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A new species of the marine spider genus *Paratheuma* (Araneae: Agelenidae) from Okinawajima Island, Japan

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Abstract — A new species of the genus *Paratheuma* (Agelenidae) is described from the coast of Awase, Okinawa City, Okinawajima Island, Japan under the name, *Paratheuma awasensis* sp. nov. The aspect and color of the bodies of both the sexes of this new species resemble those of *Paratheuma shirahamaensis* (Oi 1960) and *P. insulana* (Banks 1902) hitherto recorded from Japan, but is clearly distinguished not only from these Japanese species but also from all the known species of the genus by the shape of distal processes of male palpal conductor, the shape of epigynum and female genitalia, the number of marginal teeth of cheliceral fang furrow, and the size of body. Spiders of the new species were collected from underside of holey coral stones on tidal flats of the coast of Awase, Okinawa City. They weave retreats with a sheet web in the cavities of stones.

Key words — Agelenidae, *Paratheuma*, new species, marine spider, Awase, Okinawajima Island

Introduction

The genus *Paratheuma* Bryant 1940 is composed of nine species of marine spiders distributed in coastal areas and islands of the Pacific Ocean and partly in West Indies (Beatty & Berry 1988 a, b; Yaginuma 1986; Ono 2006, 2009). Although the family to which this genus belongs is unstable, the author considers *Paratheuma* as a member of Agelenidae, following Yaginuma (1986) and Ono (2009). Up to the present, two species of the genus, *Paratheuma shirahamaensis* (Oi 1960) and *P. insulana* (Banks 1902), were known from Japan (Ono 2006, 2009).

Since long ago, the author has observed marine spiders of the families Agelenidae and Desidae (*Desis* species) in Ryukyu Islands. Recently, the author collected interesting spiders of *Paratheuma* from the coast of Awase, Okinawa City, eastern side of Okinawajima Island. The coast of Awase formed by developed tidal flats has been watched as one of protection areas of the natural environment (Fig. 13). The spiders weave retreats with a sheet web in cavities of underside of the holey stones changed from broken coral pieces (Figs. 14–15).

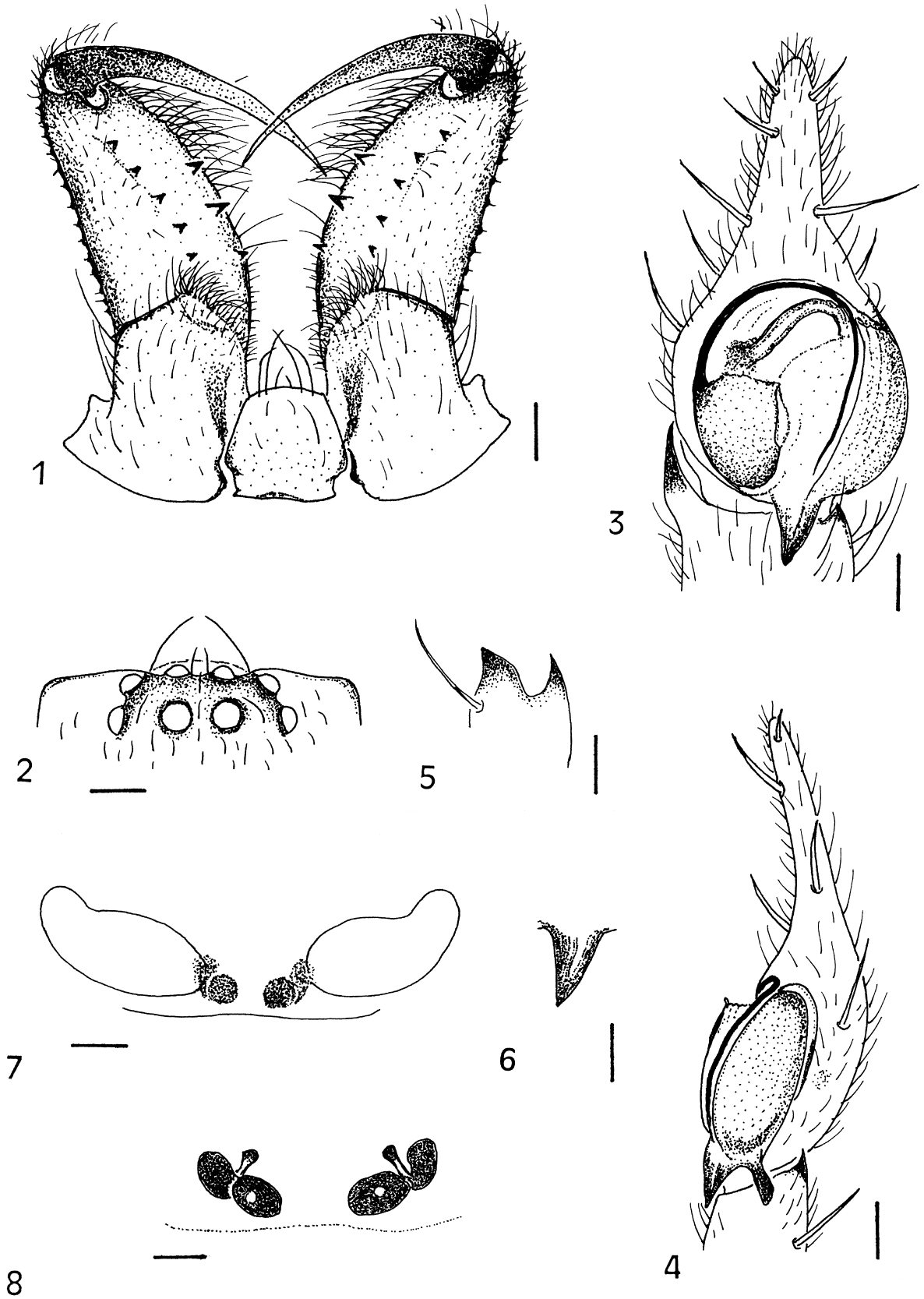
The specimens from Awase were compared with the two known species from Japan. Some male and female specimens of *Paratheuma insulana* collected by the author from Uotsurijima, Minami-kojima and Kita-kojima Islands of the Senkaku Islands in 31-III–5-IV-1971 were used as the comparative materials (NSMT-Ar 9899–9900). This species is quite different from the spiders from Awase in having the hook-shaped distal processes of male palpal conductor and seven teeth on retromargin of cheliceral fang furrow in male, and also different in the structure of female genitalia. *Paratheuma shirahamaensis* is distributed widely from Hokkaido to Okinawa. In this species, the distal processes of male palpal conductor are finger- or thumb-shaped (Ono 2009, figs. 2-2-34-52–53) and the epigynum is sidelong-ellipsoid. These characters resemble those of the spiders from Awase. However, a geographic variation was known in *P. shirahamaensis* as performed by Ono (2006, fig. 6), including a figure of male specimen from Okinawajima Island.

The spiders from Awase are presumed to belong to an independent species not only by morphological aspects but also by ecological observations. Although spiders of *Paratheuma shirahamaensis* (type locality: Shirahama, Wakayama Prefecture, Honshu) and *Paratheuma insulana* (Okinawajima Island, 2♂2♀ collected by the author in September 2012, unpublished) are found in the seashore above the high-water line, the spiders from Awase were found in the intertidal zone, which is under seawater at full tide.

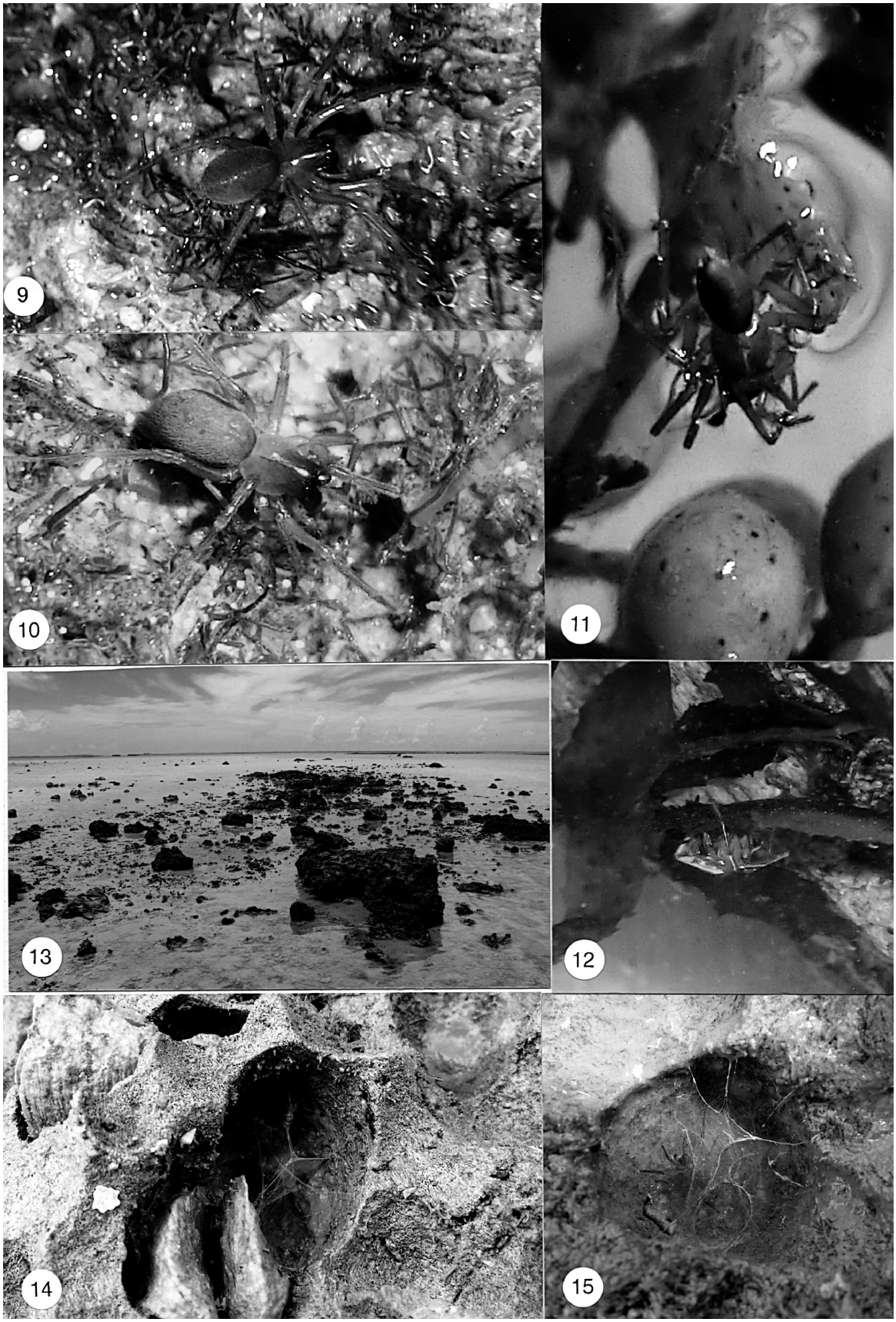
After a careful examination of details in male palpal organ, female genitalia, and number of teeth on retromargin of cheliceral fang furrow in male, the author came to the conclusion that this ecologically rare spider in marine is new to science, which is described in the present paper.

Paratheuma awasensis sp. nov.
[Japanese name: Awase-isotanagumo]
(Figs. 1–12)

Type materials. Holotype (NSMT-Ar 9895), ♂, the coast of Awase, Okinawa City, Okinawa Prefecture, Japan, 16-VII-2012, collected by Matsuei Shimojana; allotype



Figs. 1–8. *Paratheuma awasensis* Shimojana, sp. nov., male holotype (1–6) and female allotype (7–8). 1. Chelicerae, maxillae and labium, ventral view; 2. Eye area, dorsal view; 3. Male left palp, ventral view; 4. Same, retrolateral view; 5. Retrolateral tibial apophysis of male palp; 6. Distal process of male palpal conductor (ventral one), ventral view; 7. Epigynum; 8. Internal organs of female genitalia, dorsal view. Scales = 0.5 mm (1–2), 0.1 mm (3–8).



Figs. 9–12. *Paratheuma awasensis* Shimojana, sp. nov. 9. Male holotype (body length: 3.5 mm); 10 Female allotype (body length: 4.0 mm); 11–12. Male paratype, under seawater. **Fig. 13.** Habitat of *P. awasensis*. **Figs. 14–15.** Retreat and web of *P. awasensis*.

(NSMT-Ar 9896), ♀, same data as for the holotype; paratypes (NSMT-Ar 9897–9898), 2♂2♀, same locality and collector, 18-VII-2012; all deposited in the Department of Zoology (Tsukuba), National Museum of Nature and Science, Tokyo.

Description. *Male* (holotype). Total length 3.5 mm. Cephalothorax pear-shaped as seen from above (Figs. 9–10), median furrow apparent. Anterior eye row recurved and posterior one slightly recurved as seen from above, anterior median eyes smaller than the others (Fig. 2). The shape of chelicerae, maxillae and labium as shown in Fig. 1. Chelicera with three promarginal teeth and five small retromarginal teeth (Fig. 1). Tibial apophyses of male palp developed, the tip of retrolateral one divided and pointed (Figs. 3, 5). Embolus filiform, distal processes of conductor fang-shaped (ventral one, Figs. 3, 6) and spatulate (retrolateral one, Fig. 4).

Female (allotype). Total length 4.0 mm. Body shape almost same as in the male (Figs. 9–10), but the size is larger than that of the male. Cheliceral promargin with three teeth, and retromargin with seven (left) or five (right) teeth. The shape of epigynum sidelong-ellipsoid in ventral view, its upper margin slightly concaved, not chitinoid (Fig. 7). Female genitalia as shown in Fig. 8; spermatheca small and ellipsoid, with a small copulatory duct on the middle part.

Coloration and markings (in living spiders). Males and females. Cephalic area reddish brown and gradually changed to yellowish brown toward thorax. Maxillae and chelicerae reddish brown. Ventral surface of prosoma almost yellowish brown. Venter of abdomen generally gray with a pair of longitudinal yellowish gray markings. Legs light brown and gradually lighter toward light yellowish metatarsi. Color of the female relatively paler than that of the male.

Etymology. The specific name is derived from the type locality, the coast of Awase in Okinawajima Island.

Distribution. Known only from the type locality, Okinawajima Island.

Biology. Spiders of the new species live in the intertidal zone of Awase coast and weave small tubular retreats with a sheet web in cavities of the underside of holey coral stones on the tidal flats (Figs. 13–15).

Remarks. The new species slightly resembles two Japanese species, *Paratheuma shirahamaensis* (Oi 1960) and *P. insulana* (Banks 1902) (cf. Oi 1960, pl.1, figs. 10–15; Yaginuma 1986, pl. 40, fig. 7; Ono 2006, figs. 6a–h, 7a–i; 2009, figs. 2-2-34-52–60), but can be clearly distinguished from these known species by the structure of male palp, especially the chitinous spatulate shape of distal process of conductor (Fig. 4), five retromarginal teeth on chelicera in male (Fig. 1), the shape of epigynum and internal organs of female genitalia (Figs. 7–8), and the smallest body size of both the sexes in Japanese *Paratheuma* species.

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